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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/936,611	09/14/2001	Takuya Nakashima	L7016.01127	7319

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EXAMINER

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 03/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/936,611

Applicant(s)

NAKASHIMA ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 5-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 5-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 29, 2004 has been entered.

This Office action addresses claims 1, 5-10 and newly added claims 11-14. All the claims are rejected over JP 4-132174 for substantially the reasons of record. This action is non-final.

Claim Rejections - 35 USC § 103

2. Claims 1 and 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 4-132174.

The reference teaches a non-aqueous electrolyte secondary battery (see abstract). The positive electrode comprises manganese oxide (see abstract), which becomes a lithium manganese composite oxide during cycling of the battery. Regarding claims 1, 7, and 11-14, the negative electrode contains a carbonaceous material (coal-type pitch coke) capable of occluding

and releasing lithium ions (see page 7, line 5 of translation). Regarding claims 1 and 7, the negative electrode further contains a carbide of sodium or potassium, or calcium (see pages 8 and 9 of the translation). Regarding claims 8-10, the carbide may be Na_2C_2 or K_2C_2 .

Although the reference does not appear to teach that the manganese oxide contains lithium when synthesizing the oxide, this is a process limitation that is not seen to further limit the structure of the claimed battery. Generally, process limitations in product claims are accorded little patentable weight (MPEP §2113).

The reference further does not appear to teach the weight percentages of sodium or potassium as recited in claim 1, or that the negative electrode is made by mixing the sodium, potassium, or calcium compound and the carbonaceous active material and forming a slurry, as recited in claim 7.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be sufficiently skilled to adjust the weight percentage of sodium or potassium in the negative electrode mixture so as to affect the resulting properties of the electrode. As shown in Figure 3 of the reference, the optimal sodium carbide content appears to be around 1%. Such a value would render claimed range of 0.01-10 wt% sodium obvious.

Furthermore, the recitation in claim 7 that electrode is made by forming a slurry of the compounds is not considered to distinguish over the reference. Casting methods which involve slurry formation are efficient and inexpensive ways of forming electrode mixtures. As such, the artisan would be motivated to form the negative electrode of JP '174 by forming a slurry.

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3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 4-132174 as applied to claims 1 and 7-14 above, and further in view of Iwata et al (U.S. Patent 6,168,888).

JP '174 does not expressly teach that the lithium manganese oxide is a cubic material possessing the properties recited in instant claim 5.

Iwata et al. is directed to a cubic spinel-type lithium manganese oxide containing heteroelements (see abstract). In column 2, line 48, the reference teaches that the lattice constant is between 8.19 and 8.24 angstroms. In column 2, line 63, the reference teaches that the average particle diameter is 1-50 microns and the BET surface area is 0.1-5 m²/g.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the lithium manganese oxide of Iwata et al. in the battery of JP '180. In column 1, line 51, Iwata et al. teach the following:

It is an object of the present invention to provide a high-performance spinel-type lithium-manganese oxide for use as a material for positive electrodes of a Li secondary battery with inhibited Mn dissolution in an organic electrolyte, as well as a high-performance lithium secondary battery using said lithium-manganese oxide as a positive electrode.

As such, the artisan would be motivated to use the lithium manganese oxide of Iwata et al. in the battery of JP '180, thereby rendering the subject matter of claim 5 obvious.

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4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 4-132174 as applied to claims 1 and 7-14 above, and further in view of Wang et al (U.S. Patent 5,532,084).

JP '174 does not expressly teach that the lithium manganese oxide is a rhombic system material possessing the properties recited in instant claim 6.

Wang et al. is directed to a manganese dioxide product (see abstract). In column 4, line 32, the reference teaches that the manganese dioxide is orthorhombic with lattice constants of 4.5, 9.28, and 2.87 angstroms.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the manganese dioxide of Wang et al. in the battery of JP '180. In column 2, line 23, Wang et al. teach the following:

new name) in the figures and description herein. The P-CMD product of the invention when used as cathode active material in electrochemical cells, particularly alkaline and lithium cells, provides these cells with higher capacity and energy density per gram than are obtainable from the same cells employing conventional chemical manganese dioxide (CMD) or electrolytic manganese dioxide (EMD). Additionally, the discharge voltage profiles of cells, particularly lithium cells, containing the P-CMD as cathode active material, are higher than in conventional cells employing EMD or CMD cathode material. This is very attractive in that the use of P-CMD as cathode material can result in a higher power cell. The P-CMD product is characterized by

Accordingly, the artisan would be motivated to use the manganese oxide of Wang et al. in the battery of JP '180, thereby rendering the claimed lattice constants obvious. Furthermore, the artisan would be sufficiently skilled to manipulate the average diameter and surface area of the manganese dioxide so as to fall within the claimed ranges. These parameters are known to affect the resulting electrochemical properties of an active material. It has been held that the discovery

of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Response to Arguments

5. Applicant's arguments filed November 29, 2004 have been fully considered but they are not persuasive. Applicant states that "the claims have been amended to exclude the inclusion of lithium." However, the independent claims merely recite materials capable of occluding lithium, and do not contain language excluding lithium (e.g., lithium ions) per se. It is noted that claim 12, however, excludes lithium *metal* and lithium-containing *alloy*. Nonetheless, it is submitted that the JP '174 reference discloses a pitch coke as the main portion of its negative active material. This material is carbonaceous and does not contain lithium. The sodium and potassium compounds are additives to this carbonaceous material. Thus, each of the materials recited in claims 1 and 7-14 is disclosed by the reference. As such, the amendments to the claims still do not distinguish the claims over the JP '174 reference.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr, can be reached at (571) 272-1414. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau
Primary Examiner
Art Unit 1746
March 4, 2005